

Application No. 10/707,302
Docket No. 133663
Amendment dated January 9, 2006
Reply to Office Action of September 9, 2005

Amendments to the Specification:

Please replace paragraph [0001] under "Cross Reference to Related Applications" on page 1 of the specification with the following amended paragraph:

This is a continuation-in-part patent application of co-pending United States patent application Serial No. 10/463,441, ~~{Attorney Docket No. 132847}~~, filed June 18, 2003, now U.S. Patent No. 6,807,860.

Please replace paragraph [0043] with the following amended paragraph:¹

Figure 3 represents an alternative to the chemical analysis approach described above, in which the boundary points of the transition zone 20 are ascertained by ultrasonically examining the rough-machined forging 10. Such an approach is disclosed in copending and

¹ The USPTO authoring software automatically placed the page and paragraph numbers in Applicants' electronically-filed application, and as such the pages and paragraphs of the Examiner's and Applicants' copies of the application should be identically numbered. Therefore, all references to pages and paragraphs in the application will be based on the page and paragraph numbers appearing on Applicants' copy of the electronically-filed application.

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commonly-assigned U.S. Patent No. 6,807,860, ~~Application Serial No. {Attorney Docket No. 132847}~~, incorporated herein by reference.

In an investigation in which this approach was implemented in the present invention, an ultrasonic transducer 78 was placed against the outer surface of the forging 10, and ultrasonic energy was transmitted through the forging 10 along the transition zone 20 to detect changes in the response of the forging material to ultrasonic energy. As evidenced by Figure 8, ultrasonic inspection of the forging 10 produced a noise pattern corresponding to variations in the metallurgical characteristics within the forging 10, such as differences in grain size attributable to the changes in chemistry between the transition zone 20 and the adjacent regions 22 and 24. After filtering the peak noise at each scan line, the data is fitted to a circular or elliptical contour 26 representative of the expected cross-sectional (two-dimensional) shape of each transition zone boundary. Figure 9 represents a three-dimensional image 27 generated by combining multiple contours 26 taken along the length of the forging 10.